

Claim Amendments:

Claims 1-47 (canceled)

B1 | 48. (new): A reactor for the plasma assisted processing of a gaseous medium, said reactor including a pair of electrodes having facing surfaces and spaced from each other for providing a separation therebetween, said separation of said facing surfaces being substantially uniform and defining a space between said pair of electrodes, a body of dielectric material positioned for providing a dielectric barrier between said pair of electrodes and configured for dividing said space between said pair of electrodes into a plurality of gas passages, said gas passages providing a plasma volume for said reactor, said gas passages having lengths along which gas flows during use of said reactor, said gas passages being aligned so that said lengths extend between and in a direction parallel with said facing surfaces of said pair of electrodes, said gas passages being spaced apart from one another in a direction transverse to said facing surfaces, said gas passages including a pair of opposed sides having a contour which matches a contour of said facing surfaces of said pair of electrodes, said shape and spacing of said gas passages ~~providing for~~ <sup>being configured</sup> to provide a substantially uniform distribution of electric field across said plasma volume between said pair of electrodes.

C | 49. (new): A reactor according to claim 48, wherein said pair of electrodes are embedded in said body of dielectric material which extends across the space between said pair of electrodes, said plurality of gas passages extending longitudinally of said body of dielectric material to provide said plurality of electrically equivalent plasma volumes extending in series across said space between said pair of electrodes.

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50. (new) A reactor according to claim *48*, wherein said dielectric material is selected from the group consisting of alpha or gamma aluminas, cordierite, mullite, alumino silicate ceramics, silicon carbide, micaceous glass or mixtures of these.

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51. (new) A reactor according to claim *48* wherein said gas passages have surfaces which present a catalytically active surface to gaseous medium passing through said gas passages.

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*Contd*  
*5*  
52. (new) A reactor according to claim *51*, wherein said surfaces of said gas passages are coated, impregnated or treated by ion-exchange or doping, with a catalytically-active material.

*7*  
53. (new) A reactor according to claim *51* in combination with an internal combustion engine for treating exhaust therefrom, wherein said catalytically active surface is catalytically active towards the reduction of the emissions of one or more of nitrogenous oxides, particulate including carbonaceous particulate, hydrocarbons including polyaromatic hydrocarbons, carbon monoxide and other regulated or unregulated combustion products contained in said exhaust of said internal combustion engine.

*6*  
54. (new) A reactor according to claim *52*, wherein said catalytically-active material is selected from the group consisting of alpha and gamma aluminas and mixtures thereof, ferroelectric materials, titanates, ~~barium titanate~~, titania, ~~anatase phase titania~~, zirconia, vanadia, silver aluminate, perovskites, ~~including layered perovskites and La<sub>2</sub>CuO<sub>4</sub>~~, ~~La<sub>1.9</sub>K<sub>0.1</sub>Cu<sub>0.95</sub>V<sub>0.05</sub>O<sub>4</sub>~~, and ~~La<sub>0.9</sub>K<sub>0.1</sub>CoO<sub>3</sub>~~, spinels, metal-doped and

C metal oxide-doped or exchanged, inorganic oxides, cobalt  
C oxide-doped or exchanged inorganic oxides, cobalt oxide-doped  
C alumina, vanadates, potassium metavanadate, caesium  
C metavanadate, pyrovanadates, potassium pyrovanadate, caesium  
C pyrovanadate, metal-doped zeolites, zeolites of ZSM-5, Y,  
C beta, mordenite all of which zeolites may contain iron, cobalt  
C or copper with or without additional catalyst promoting cat-  
C ions including cerium and lanthanum and alkali metal contain-  
C ing zeolites in particular sodium Y zeolites, and mixtures of  
any of these materials.

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55. (new) A reactor according to claim 48, wherein said  
gas passages contain a gas permeable body of an insulating  
filling material.

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56. (new) A reactor according to claim 55, wherein said  
insulating filling material comprises a dielectric material.

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57. (new) A reactor according to claim 56, wherein said  
dielectric material is a catalytically active material.

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58. (new) A reactor according to claim 56, wherein said  
dielectric material is coated, impregnated or otherwise  
treated with a catalytically active material.

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59. (new) A reactor according to claim 56, wherein said  
dielectric material develops catalytically active properties  
by virtue of exposure to plasma in said gas passages.

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60. (new) A reactor according to claim 48, wherein said  
pair of electrodes are planar and said gas passages have a  
generally rectangular cross section with major transverse  
dimensions parallel to those of said facing surfaces of said

pair of electrodes.

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61. (new) A reactor according to claim 48, wherein said pair of electrodes are in the form of two concentric cylinders and said gas passages comprise a plurality of regularly spaced slots of cylindrical form.

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62. (new) A reactor according to claim 48 in combination with a power supply for applying a voltage to said reactor, wherein said gas passages are arranged such that a potential drop across said plasma volume between said pair of electrodes is equal to approximately half said voltage applied to said reactor.

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63. (new) A reactor according to claim 62, wherein said power supply for said reactor is provided by an integrated starter alternator damper system.

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64. (new) A reactor according to claim 48, wherein an electrical-generating power supply for said reactor is selected from the group consisting of fuel cells, gas turbines, solar cells and heat exchangers.

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65. (new) A reactor according to claim 48 incorporated as part of an emissions control system.

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66. (new) A reactor according to claim 65, wherein said emissions control system is used in conjunction with an engine management system.

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67. (new) A reactor according to claim 65, wherein said emissions control system includes an additional gas passage outside of said plasma region of the reactor in series with

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the aforesaid gas passages, said additional gas passage containing gas permeable catalytically active material.